METHOD OF PREDICTION OF IN-VIVO POLYMER PERFORMANCE BY EXTERNAL EXPERIMENTATION

What is claimed is:

1. A method for predicting in-vivo polymer performance in a mammalian body via external experimentation, comprising the steps of:

(a) determining stress levels and the duration times of stress application, denominated a daily stress cycle that the polymeric component will be subjected to during mammalian body activities for the lifetime of the device;

(b) determining compressive creep and recoverable creep compliance at selected stresses, as determined in step (a), and temperatures to obtain master curves of compressive creep compliance that analytically define compressive creep strain as functions of time and stress;

(c) determining single creep/creep recovery strain curves for each mammalian body activity of step (a) calculated from the compressive creep compliance master curves of step (b), wherein a creep phase is interrelated to a recovery phase, to obtain a compressive creep model for a single stress cycle;

(d) determining a total residual strain after repeated stress cycles from the compressive creep model of step (c), to obtain a compressive creep model for the polymer subjected to repeated daily mammalian activities, denominated compressive stress cycles;

(e) computing maximum compressive strain curves from a compressive strain during an activity in relation to number of days of activity, wherein the number of days can range from a few days to several years; and

(f) using the maximum compressive strain curves of step (e) to predict in-vivo performance of the polymer by calculating polymer deflection as a function of original geometry of the device to be made of the polymer.